

REMARKS

Applicants have carefully reviewed and considered the non-final Office Action mailed June 13, 2006, together with the references supplied by the examiner. Applicants respectfully disagree with the rejections that have been made, and request a favorable reconsideration of Applicants' claims in view of the comments and observations which follow.

Considering now the substance of the Office Action, Claims 1-2, 4-7, 12 and 18 have been rejected as anticipated under 35 USC 102(b) by U.S. Pat. No. 3,607,049 to Weaver, Jr. et al. (Weaver). Applicants in response readily agree that Weaver does unquestionably disclose the use of cooled recycled product gases for quenching the particulate titanium dioxide and gaseous reaction products from an oxidation reactor. Applicants, in fact, would observe that Weaver's quench concept is in this respect essentially the same as the "preliminary direct heat exchange" and subsequent indirect heat exchange practice acknowledged by Weaver as part of the known art for cooling particulate titanium dioxide for subsequent handling and packaging, see, for example, col. 1, lines 24-44 of Weaver (referencing U.S. Pat. No. 2,508,272 to Booge (which was previously disclosed by Applicants to the Office)). Weaver's disclosure and contribution to the art of cooling pigment from an oxidation reactor are directed not per se to this known concept, but rather to a concept for reducing the build-up of solids on the walls of the indirect heat exchanger portion of the known process and apparatus, involving adding water to the recycle quench gas stream at a temperature of below about 600 degrees Fahrenheit.

Applicants have likewise not claimed the mere concept of using cooled recycled product gases for a direct quench cooling of the particulate titanium dioxide and gaseous reaction products from an oxidation reactor, but instead claim as their invention the particular discovery that by quenching in the reactor at a particular location – namely, in claim 1, "where the reaction is essentially complete and titanium dioxide particles are no longer growing in size" – the grindability of the pigment in subsequent fluid energy milling, for example, is improved. Weaver says nothing about the grindability of the pigments made in his process nor about the effect of quenching on grindability, but more importantly teaches the injection of cooled recycled product gases not in the reactor but

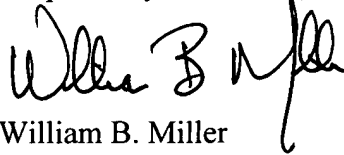
following the reactor and prior to the reactor effluent stream's entering an indirect heat exchanger, see, e.g., col. 3, lines 14-18 and 31-33, also the Figure in Weaver. Weaver does not disclose and does not suggest injection of cooled recycled product gases in the particular location claimed by Applicants. The location of the injection should be recognized as key to Applicants' invention, as too early an injection can result in unreacted titanium tetrachloride and incomplete product particle growth while quenching too far downstream will be ineffective as the difficult-to-grind aggregates will have already formed.

Claims 1-2 and 4-19 have also been rejected under 35 USC 103(a) as unpatentable over U.S. Pat. No. 3,694,168 to Hilgers et al. (Hilgers), but Hilgers is distinguishable on the same grounds. Hilgers again discloses the possibility of recycling cooled recycled product gases for direct quench cooling in his process, and in contrast to Weaver does describe injecting the quench gases into the pyrogenic TiO₂ reactor; however, the injection point in Hilgers '168 is at the beginning of the reaction rather than at the particular location discovered by Applicants as providing a needed improvement in raw pigment grindability – per claim 1, “where the reaction is *essentially complete* [emphasis added] and titanium dioxide particles are no longer growing in size”. That Hilgers' contemplated injection point is at the beginning of the reaction is made clear at column 3, line 56 through column 4, recognizing that the cooled recycled product gases would be used to cool the rotary body, the rotary body's purpose in turn being to facilitate the start-up of the oxidation of titanium tetrachloride by mixing the reactants together, see column 2, lines 60-65.

Claims 1-19 were also rejected under 35 USC 103(a) as obvious over Hilgers '168 in view of U.S. Pat. No. 6,419,893 to Yuill et al. Yuill et al. also does not teach the injection of cooled recycled product gases according to Applicants' claims, and respectfully, would provide no suggestion or motivation to modify Hilgers in a way that would provide Applicants' claimed invention and remedy Hilgers' deficiencies.

Applicants thus earnestly request reconsideration of our claims and a withdrawal of the rejections of record.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "William B. Miller", written in a cursive style.

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